FELLERS, SNIDER, BLANKENSHIP,
BAILEY & TIPPENS, P.C.
Bank One Tower
100 North Broadway Avenue, Suite 1700
Oklahoma City, OK 73102-8820
TELEPHONE: (405) 232-0621
TELECOPIER: (405) 232-9659

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Art Group 2653	571/273-8300	571/272-2600

RE: **Application No. 10/756,877**
In re application of: Lon Richard Buske, et al.
Assignee: SEAGATE TECHNOLOGY LLC
Dkt. No.: 10331.1/40176.64USC1

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Transmission by Facsimile on February 28, 2006 ***PATENT***
Dkt. 10331.1/40176.64USC1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	**Lon Richard Buske,et al.**		
Assignee:	**SEAGATE TECHNOLOGY LLC**		
Application No.:	**10/756,877**	Group No.:	**2653**
Filed:	**January 13, 2004**	Examiner:	**Allen Heinz**

For: **SERVO TRACK WRITER WITH ACTUATOR VIBRATION ISOLATION**

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION--37 C.F.R. § 41.37)

1. Transmitted herewith, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on December 22, 2005 and Notice of Panel Decision from Pre-Appeal Brief Review mailed from the USPTO on January 31, 2006. As indicated in the Notice of Panel Decision "The time period for filing an appeal brief will be reset to be one month from mailing this decision, or the balance of the two-month time period running from the receipt of the notice of appeal, whichever is greater."

2. STATUS OF APPLICANT

   This application is on behalf of other than a small entity.

3. FEE FOR FILING APPEAL BRIEF

   Pursuant to 37 C.F.R. § 41.20(b)(2), the fee for filing the Appeal Brief is:

other than a small entity	$500.00
Appeal Brief fee due	**$500.00**

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a)

I hereby certify that, on the date shown below, this correspondence is being:

TRANSMISSION

☒ facsimile transmitted to the Patent and Trademark Office, (571) 273 - 8300.

Diana C. Anderson
Signature

Date: February 28, 2006

Diana C. Anderson
(type or print name of person certifying)

4. EXTENSION OF TERM

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136 apply.

Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal brief fee	$500.00
TOTAL FEE DUE	**$500.00**

6. FEE PAYMENT

Authorization is hereby made to charge the amount of $500.00 to Credit card as shown on the attached credit card information authorization form PTO-2038.

A duplicate of this transmittal is attached.

7. FEE DEFICIENCY

If any additional extension and/or fee is required, and if any additional fee for claims is required, charge Deposit Account No. 06-0540.

Date: 2/24/2006

Respectfully submitted,

Mitchell K. McCarthy, Registration No. 38,794
Randall K. McCarthy, Registration No. 39,297
Fellers, Snider, Blankenship, Bailey & Tippens, P.C.
100 North Broadway, Suite 1700
Oklahoma City, OK 73102-8820
Telephone: 405-232-0621
Fax: 405-232-9659
Customer No. 33900

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PATENT
Dkt. 10331.1/40176.64USC1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

COPY

In re application of: Lon Richard Buske,et al.
Assignee: SEAGATE TECHNOLOGY LLC
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7. FEE DEFICIENCY

If any additional extension and/or fee is required, and if any additional fee for claims is required, charge Deposit Account No. 06-0540.

Date: 2/28/2006

Respectfully submitted,

Mitchell K. McCarthy, Registration No. 38,794
Randall K. McCarthy, Registration No. 39,297
Fellers, Snider, Blankenship, Bailey & Tippens, P.C.
100 North Broadway, Suite 1700
Oklahoma City, OK 73102-8820
Telephone: 405-232-0621
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In re Application of: Lon Richard Buske, et al.
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For: SERVO TRACK WRITER WITH ACTUATOR VIBRATION ISOLATION

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, Virginia 22313-1450

ATTENTION: Board of Patent Appeals and Interferences

Sir:

APPELLANT'S BRIEF

This brief is in furtherance of the Notice of Appeal that was filed in this case on December 22, 2005. The required fees, any required petition for extension of time for filing this brief, and the authority and time limits established by the Notice of Appeal are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a)

I hereby certify that, on the date shown below, this correspondence is being:

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Diana C. Anderson
Signature

Date: February 28, 2006

Diana C. Anderson
(type or print name of person certifying)

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This brief contains these items under the following headings, and in the order set forth below:

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is the party named in the caption of this brief.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

The status of the claims in this application is:

Claim	Status
10. (Allowed)	Independent.
13. (Allowed)	Depends from claim 10.
16. (Allowed)	Independent.
17. (Allowed)	Depends from claim 16.
18. (Allowed)	Depends from claim 16.
19. (Allowed)	Depends from claim 18.
20. (Allowed)	Depends from claim 16.
21. (Allowed)	Depends from claim 20.
22. (Previously presented)	Independent.
23. (Previously presented)	Depends from claim 22.
24. (Previously presented)	Depends from claim 23.
25. (Previously presented)	Depends from claim 24.

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application: 10, 13, and 16-25

B. STATUS OF ALL THE CLAIMS

1. Claims canceled: 1-9, 11-12, and 14-15
2. Claims withdrawn from consideration but not canceled: none
3. Claims pending: 10, 13, and 16-25
4. Claims allowed: 10, 13, and 16-21
5. Claims rejected: 22-25
6. Claims objected to: none

C. CLAIMS ON APPEAL

Claims now on appeal: 22-25

IV. STATUS OF AMENDMENTS

Applicant filed an after-final amendment on November 29, 2005, but it was not entered. Applicant filed a pre-appeal brief request for review on December 22, 2005, but the Panel did not withdraw the final rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The embodiments of the present invention as recited by the language of independent claim 22 contemplate a track writing apparatus 136 shown generally in FIGS. 2 and 3. The track writing apparatus has a statically pressurized fluid bearing 152 shown generally in FIG. 4. The bearing 152 has a spindle 188 contained within a race 190. The interface between the spindle 188 and race 190 provides a chamber for receiving pressurized gas through a port 192, thereby creating a substantially frictionless float. (see para. [0038]) The bearing 152 supports a data transfer head 140 relative to a storage medium 108.

The embodiments of the present invention as recited by the language of the dependent

claims of claim 22 generally contemplate the bearing 152 rotationally supporting the data transfer head 140, as well illustrated in FIG. 8 and in block 508 of FIG. 9. Preferably, the fixed race 190 is in noncontacting (frictionless) engagement with the rotatable spindle 188 (see para. [0038]). In some embodiments the spindle operably rotates around an axis of rotation that is substantially perpendicular to a direction of gravitational force (see para. [0040]).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 22-25 stand rejected under 35 USC 112, first paragraph, as not being enabled by the specification.
2. Claims 22-25 stand rejected under 35 USC 102(b) as being anticipated by Sanada '315.

VII. ARGUMENT

This Appeal turns on whether a skilled artisan would ascribe common meaning to a "statically pressurized fluid bearing." Applicant now reiterates in the affirmative.

THE EXAMINER'S FAILURE TO ASCRIBE COMMON MEANING TO THE CLAIM TERM "STATICALLY PRESSURIZED FLUID BEARING" IS CLEAR ERROR

The Examiner stated the following as a basis for making the rejection of claim 22 final: "The "statically pressurized fluid bearing" feature is not disclosed in the specification; e.g. what is "static" pressurization?" (Office Action of 9/29/2005, pg. 2)

Applicant has repeatedly argued that the skilled artisan readily understands that a "statically pressurized fluid bearing" means one in which the bearing surfaces are separated

by an external pressure source, independently of any bearing rotation; which is readily distinguishable from a "dynamically pressurized fluid bearing" that is pressurized by rotation of the bearing. (see Applicant's Response of 8/17/2005, pg. 7; Applicant's Response of 11/29/2005, pg. 5; Applicant's Pre-Appeal Brief Request for Review filed 12/22/2005, pg. 1-2)

Attached is further evidentiary support from an online encyclopedia supporting what Applicant has previously argued.[1] This passage of the reference clearly defines what the common meanings of "static" and "dynamic" are in relation to fluid bearings:

> There are two principal ways of getting the fluid in to the bearing. In gas bearings and hydro**static** bearings, the fluid is pumped in through an orifice or through a porous material. In hydro**dynamic** bearings, bearing rotation sweeps the fluid in to the bearing, forming a lubricating wedge under or around the shaft.
> (evidentiary reference no. 1, pg. 1, emphasis added)

The correct standard for applying the enablement requirement is that the specification must teach those skilled in the art how to make and use the claimed invention without undue experimentation. *In re Wright*, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993). Applicant now reiterates that the specification clearly discloses that the *statically pressurized fluid bearing* is pressurized by an external pressure source, not by rotation of the bearing itself. (see, for example, "An air port 192 in the outer race 190 provides communication between an external air source (not shown) and the chamber...." para. [0038]) Accordingly, the Examiner is incorrect in stating that the specification does not disclose a *statically pressurized fluid bearing*.

The specification and other evidence of record clearly establishes the skilled artisan would readily understand the common meaning of *statically pressurized fluid bearing* as

claimed. The Examiner's failure to ascribe the proper enablement standard, but rather substituting his own personal opinion, is clear error.

Accordingly, Applicant's position is that the rejection of claim 22 and the claims depending therefrom is erroneous as a matter of law and should be reversed because the specification clearly enables a skilled artisan to make and use the invention as claimed without undue experimentation.

IT IS CLEAR ERROR THAT THE EXAMINER HAS NOT SUBSTANTIATED THE ANTICIPATORY REJECTION OVER SANADA '315 FOR THE *STATICALLY PRESSURIZED FLUID BEARING* OF CLAIM 22

The rejection is clearly not proper and without basis because the Examiner has failed to cite a reference that identically discloses all the recited features of the rejected claim, thereby failing to substantiate a prima facie case of anticipation.

Applicant has repeatedly argued that Sanada '315 discloses only a dynamic fluid bearing, not a static fluid bearing. (see Applicant's Response of 8/17/2005, pg. 7; Applicant's Response of 11/29/2005, pg. 6; Applicant's Pre-Appeal Brief Request for Review filed 12/22/2005, pg. 2-3) This fact is evident from a plain reading of the cited reference:

> The small gap S1 formed between the opposite end portions of the cylindrical boss portion 1A of the holder arm 1 and the respective flange portions 3A of the cylindrical sleeve 3 and the small gap S2 formed between the inner side surface of the holder arm 1 and an outer side surface of the cylindrical sleeve 3 are selected such that a <u>predetermined dynamic hydraulic pressure is generated by rotation of the cylindrical sleeve 3</u> by the motor 4. (Sanada '315, col. 2 lines 48-55, emphasis added)

[1] http://en.wikipedia.org/wiki/Fluid_bearing

Sanada '315 is in fact wholly silent regarding a *statically pressurized fluid bearing* as in the present embodiments as claimed. This rejection is thereby clearly not proper and without basis because the cited reference does not identically disclose all the recited features of the rejected claims. Further, the Examiner's attempt at reading a reference disclosing a dynamically pressurized bearing onto the claim term *statically pressurized fluid bearing* is an unreasonably broad construction because it ignores the plain meaning of the term, and in effect ignores claim language. *In re Morris*, 43 USPQ2d 1753 (Fed. Cir. 1997)

The Applicant's position is that the anticipatory rejection of claim 22 and the claims depending therefrom is erroneous as a matter of law and should be reversed because the Examiner has failed to substantiate a prima facie case of anticipation.

Conclusion

In conclusion, Applicant respectfully submits that the Examiner has not substantiated either the enablement or the anticipatory rejection of claim 22. Accordingly, the Applicant respectfully requests that the final rejection of claim 22 and the claims depending therefrom be reversed.

Respectfully submitted,

By: ______________________

Mitchell K. McCarthy, Reg. No. 38,794
Randall K. McCarthy, Reg. No. 39,297
Fellers, Snider, Blankenship, Bailey & Tippens
100 North Broadway, Suite 1700
Oklahoma City, Oklahoma 73102
Telephone: (405) 232-0621
Facsimile: (405) 232-9659
Customer No. 33900

VIII. CLAIMS APPENDIX

1.-9. (Cancelled)

10. (Allowed) An actuator assembly for recording information onto a disc surface in a multi-disc track writer, the actuator assembly comprising:

an E-block having one or more elongated actuator arms, each actuator arm having a distally located recording head; and

means for rotating the E-block in the actuator assembly to position the recording heads over a disc surface.

11.-12. (Cancelled)

13. (Allowed) The actuator assembly of claim 10 further comprising means for moving the actuator between a recording position and a disc loading and unloading position.

14.-15. (Cancelled)

16. (Allowed) A track writing apparatus comprising:

an actuator assembly comprising a stationary actuator block having a cavity therein; and

a rotational gas bearing comprising an outer race fixed to the actuator block and a rotatable inner spindle fixed in rotation with a head for storing data on the track.

17. (Allowed) The apparatus of claim 16 wherein the rotational gas bearing defines a gap between the outer race and the inner spindle adapted for containing a pressurized fluid supporting the inner spindle in a non-contacting engagement with the outer race.

18. (Allowed) The apparatus of claim 16 wherein the inner spindle is operably rotatable around an axis of rotation that is substantially perpendicular to a direction of gravitational force.

19. (Allowed) The apparatus of claim.18 wherein the heads are rotated around the inner spindle axis of rotation.

20. (Allowed) The apparatus of claim 16 further comprising a motor coupled to the inner spindle.

21. (Allowed) The apparatus of claim 20 further comprising a corner cube providing positional information for controlling the motor to position the heads.

22. (Previously presented) A track writing apparatus comprising a statically pressurized fluid bearing supporting a data transfer head relative to a storage medium.

23. (Previously presented) The apparatus of claim 22 wherein the fluid bearing rotationally supports the data transfer head.

24. (Previously presented) The apparatus of claim 23 wherein the fluid bearing comprises a fixed race in noncontacting engagement with a rotatable spindle.

25. (Previously presented) The apparatus of claim 24 wherein the spindle operably rotates around an axis of rotation that is substantially perpendicular to a direction of gravitational force.

IX. EVIDENCE APPENDIX

1. http://en.wikipedia.org/wiki/Fluid_bearing (pages 1-4)

X. RELATED PROCEEDINGS APPENDIX

There exist no relevant related proceedings concerning this Appeal before the Board.

Fluid bearing

From Wikipedia, the free encyclopedia

Fluid bearings, also called **fluid dynamic bearings** or **hydrostatic** or **gas bearings**, are bearings which support load on a thin layer of liquid or gas. They are frequently used in high load, high speed or high precision applications where ordinary ball bearings have short life or high noise and vibration. They are also used increasingly to reduce cost. For example, hard disk drive motor fluid bearings are both quieter and cheaper than the ball bearings they replace.

Contents

Operation

Fluid bearings use a thin layer of liquid or gas fluid between the bearing faces, typically sealed around or under the rotating shaft.

There are two principal ways of getting the fluid in to the bearing. In gas **bearings** and **hydrostatic bearings**, the fluid is pumped in through an orifice or through a porous material. In **hydrodynamic bearings**, bearing rotation sweeps the fluid in to the bearing, forming a lubricating wedge under or around the shaft.

Hydrostatic bearings rely on an external pump. The power for that pump is arguably part of overall bearing friction. Better seals can reduce leak rates and pumping power, but may increase friction.

Hydrodynamic bearings rely on bearing motion to sweep fluid in to the bearing and may have high friction and short life at low speed or during starts and stops. Thus, a secondary bearing may be used for startup and shutdown to prevent damage to the hydrodynamic bearing. A secondary bearing may have high friction and short operating life, but good overall service life if bearing starts and stops are infrequent.

Characteristics and principles of operation

Fluid bearings can be relatively cheap compared to other bearings with a similar load rating. The bearing can be as simple as two smooth surfaces with seals to keep in the working fluid. In contrast, a conventional bearing may require many high-precision rollers with complicated shapes. Hydrostatic and gas bearings do have the complication and expense of external pumps.

Most fluid bearings require little or no maintenance, and have almost unlimited life. Conventional mechanical ball bearings usually have shorter life and require regular maintenance. Pumped hydrostatic and aerostatic (gas) bearing designs retain low friction down to zero speed and need not suffer start/stop wear, provided the pump

does not fail.

Fluid bearings generally have very low friction -- far better than mechanical bearings. One source of friction in a fluid bearing is the viscosity of the fluid. Hydrostatic gas bearings are among the lowest friction bearings. However, lower fluid viscosity also typically means fluid leaks faster from the bearing surfaces, thus requiring increased power for pumps or seals.

Since no rigid mechanical element supports load, it may seem fluid bearings can give only low precision. In practice, fluid bearings have clearances that change less under load (are "stiffer") than mechanical bearings. It might seem that bearing stiffness, as with maximum design load, would be a simple function of average fluid pressure and the bearing surface area. In practice, when bearing surfaces are pressed together, the fluid outflow is greatly constricted. This significantly increases the pressure of the fluid between the bearing faces. As fluid bearings faces are comparatively large areas, even small fluid pressure differences cause large restoring forces, maintaining the gap.

Fluid bearings are typically quieter and smoother (more consistent friction) than mechanical bearings. It is very difficult to make a mechanical bearing which is atomically smooth and round; and mechanical bearings deform in high-speed operation due to centripetal force. In contrast, fluid-bearings self-correct for minor imperfections. For example, hard disks manufactured with fluid bearings have noise ratings for bearings/motors on the order of 20-24 dB, where the threshold for human hearing is around 25 dB. Drives based on rolling-element bearings are typically at least 4 dB noisier.

Some fluid bearings

Foil bearings

Foil bearings are a type of hydrodynamic bearing that was introduced in turbine applications in the 1960s.

Journal bearings

Pressure-oiled journal bearings appear to be plain bearings but are arguably fluid bearings. For example, journal bearings in gasoline (petrol) and diesel engines pump oil at low pressure in to a large-gap area of the bearing. As the bearing rotates, oil is carried in to the working part of the bearing, where it is compressed, with oil viscosity preventing the oil's escape. As a result, the bearing "hydroplanes" on a layer of oil, rather than on metal-on-metal contact as it may appear.

This is an example of a hydrodynamic bearing which does not use a secondary bearing for start/stop. In this application, a large part of the bearing wear occurs during startup and shutdown, though in engine use, substantial wear is also caused by hard combustion contaminants that bridge the oil film.

Hockey

Air hockey is a game based on a hydrostatic air bearing which suspends the puck and player's paddles to provide low friction and thus fast motion. The bearing uses a flat plane with periodic orifices which deliver air just over ambient pressure. The puck and paddles rest on air.

One part of ice hockey is ice skating. Ice skates are a hydrodynamic fluid bearing where the skate and ice are separated by a layer of water caused by entropy (formerly thought to be caused by pressure-induced melting; see ice skating for details).

Kingsbury/Michell tilting-pad fluid bearings

Kingsbury/Michell dynamic tilting-pad fluid bearings were invented independently and almost simultaneously by both the American tribologist Albert Kingsbury, and a British-born Australian, Anthony George Maldon Michell.

The bearing has "shoes" or "pads" on pivots. When the bearing is in operation, the rotating part of the bearing carries fresh oil in to the pad area. Fluid pressure causes the pad to tilt slightly, building a wedge of pressurised fluid between the shoe and the other bearing surface. The pad tilt adaptively changes with bearing load and speed. Various design details ensure continued replenishment of the oil to avoid overheating and pad damage.

Kingsbury/Michell fluid bearings are used in a wider variety of heavy-duty rotating equipment, including in hydroelectric plants to support turbines and generators weighing hundreds of tons. They are also used in very heavy machinery, such as submarine propeller shafts.

The first tilting pad bearing in service was probably that built under A.G.M. Michell's guidance by George Weymoth (Pty) Ltd, for a centrifugal pump at Cohuna on the Murray River, Victoria, Australia, in 1907, just two years after Michell had published and patented his three-dimensional solution to Reynold's equation. By 1913, the great merits of the tilting-pad bearing had been recognised for marine applications. The first English ship to be fitted out with the bearing was the cross-channel steamer the *Paris*, but many naval vessels were similarly equipped during the First World War. The practical results were spectacular - the troublesome thrust block became dramatically smaller and lighter, significantly more efficient, and remarkably free from maintenance troubles. It was estimated that the Royal Navy saved coal to a value of £500,000 in 1918 alone as a result of fitting Michell's tilting-pad bearings.

According to the ASME (see reference link), the first Kingsbury/Michell fluid bearing in the USA was installed in the Holtwood Hydroelectric Power Plant (on the Susquehanna River, near Lancaster, Pennsylvania, USA) in 1912. The 2.25-tonne bearing supports a water turbine and electric generator with a rotating mass of about 165 tonnes and water turbine pressure adding another 40 tonnes. The bearing has been in nearly continuous service since 1912, with no parts replaced. The ASME reported it was still in service as of 2000. As of 2002, the manufacturer estimated the bearings at Holtwood should have a maintenance-free life of about 1,300 years.

See also

- Air bearing

External links

- Michell Bearing Co. (http://www.michellbearings.com/)
- ASME History Brochure about Kingsbury's Susquehanna Bearing (http://www.asme.org/history/brochures/h123.pdf)
- Kingsbury Bearing Co. (http://www.kingsbury.com/)

Retrieved from "http://en.wikipedia.org/wiki/Fluid_bearing"

Category: Bearings